avoidable impurity only, are usually the most incisive and brilliant part of the display.

In a paper, however, on "Micrometrical Measures of Gaseous Spectra," kindly printed, but not yet published, for me by the Royal Society, Edinburgh, there is a full description of a case which will be found to supply exactly the practical details that may strengthen M. Bredichin's views.

After having had tubes, and tubes, and tubes again of CH gas, of various varieties of CH and at various pressures made by different makers, and having found their CH spectrum (under the electrical incandescence which M. Bredichin also assumes for his comets) always more or less imperfect and more and more haunted, often overpowered, by the brilliant lines of pure hydrogen, I followed out the indications of least failure by eventually having made a so-called vacuum, but really four inches of mercury pressure tube of olefiant gas. It was constructed for me, with very peculiar attention to, and precautions for, purity, by Mr. Charles F. Casella, of 147, Holborn, and attained absolute success at last, for no trace of any impurity whatever could I discover in it from one end of the spectrum to the other.

Not only so, too, but the spectrum which it did show was the most brilliant and perfect one of CH that I have ever heard of. Every one knows the five diversely coloured bands of CH, four of them first well described by Prof. Swan in 1856; each band beginning towards the red with strong lines and bright haze, which fades off towards the violet side into black, vacant space long before the next band begins. And many persons know that with greater spectroscopic power that haze is capable of being resolved into a system of smaller lines, and far closer, or linelets, but still coming to an end considerably short of where the next band begins.

But on this occasion, with the extra heavy olefiant gas-tube, strong induction sparks, and a spectroscope having 24° dispersion from A to H of solar spectrum, a telescopic magnifying power of 14, a very narrow slit and excellent definition of prisms, the linelets, usually so difficult to identify, were as sharp and clear as luminous needles, and continued, in a series of regularly-increasing spaces apart, the whole distance from one CH band to the next. This completeness was distinctly proved, first with the Orange band and its needle-like scale of linelets (after all its strong lines had been left behind), extending up so as to touch, as it were, the brilliant beginning of the Citron band. Then came *its* bright lines and closely-packed linelets continually widening in distance apart, but losing nothing in sharpness and definition until the Green band was reached. With the Green band was its leader (the so-called "Green Giant of Carbo-hydrogen") burning like a pillar of electric fire; then its close linelets; then its second line and linelets rather wider apart; its third line and linelets still wider; and onwards linelets wider yet, but preserving admirable regularity of series all the way, all the long way, without missing, or slurring, one step, the whole distance right up to the beginning of the Blue band.

Yet over one part of that lengthy road something extraneous did appear; vaguely at first, or as a mere faint ghost of a barely perceptible roll of gray-coloured cirrostratus cloud! Could it be subjective only? possibly the reflection from a fatigued part of the retina of the observer's eye. Not that, for the linelets of CH were still brilliantly sharp, thin, and narrow everywhere. What then? I, who had condemned scores of vacuum tubes of all the gases for being filled with H lines, had never seen anything like that floating, filmy cloud before!

But thought is quicker than sight. A suspicion of the truth flashed in a moment upon me; and on turning to the Red end of the Spectrum, there, over the known place of Hydrogen's Red line, was another faint broad region of barely visible luminous haze, but reddish, in place of, like the other, a blue-gray. Even, too, as I watched them, from that moment on through an hour, first turning to one and then to the other, those haze-clouds narrowed and narrowed towards their central verticals, whilst the sharp little linelets of the CH *pari passu* became paler and paler, until at last they only remained visible in the neighbourhood of the bigger lines and strong beginnings of their respective bands. And by that time the once faint clouds, the red and the gray, had become transformed into two piercingly bright lines of Hydrogen light, the representatives of Solar C and Solar F; while the carbon of the CH, which the H had been eliminated from by the action of the electric spark, was deposited on the inside of the tube as a brown glaze.

This, then, is the case of independent observation which I beg to hand over to M. Bredichin for discussion, believing it to illustrate that

(1) In the condition most suitable for showing the CH, or ordinary cometic, spectrum,—no H should appear.

(2) If a little free H should be introduced into a full atmosphere of CH, the characteristic lines of H are at first so *extra* broadened —though seen under the same circumstances that those of CH are *ultra* narrow and defined in—as to be weakened thereby below visibility, unless, indeed, the CH spectrum at the time be almost infinitely brighter than it has ever yet been found in any Comet.

(3) The longer the incandescing electric influence is at work, the greater is the evolution of pure H on one side, and deposition of solid C on the other, out of CH gas. Whence we may possess for the future an indicator for the comparative age of Comets; or, at least, may pretty certainly conclude Halley's Comet to be older than that of 1881, if bright, narrow lines of pure H, with or without CH bands accompanying, shall be visible in the spectrum of the former at its next return: that, in itself a consummation long most earnestly wished for, but now more than ever to be desired, to test the penetrating theory of a Russian Astronomer and Mathematician.

C. PIAZZI SMYTH

15, Royal Terrace, Edinburgh, January 19

## Iridescent Clouds

ON pp. 148 and 149 of the current volume of NATURE there are two letters describing "iridescent clouds," and the idea is conveyed that this phenomenon is only of late occurrence. That this is hardly justifiable, the following account from a diary will show:—

At Knoxville, Tennessee, on the afternoon of February 16, 1878, after many days of cloud and drizzle—something unusual in that country—the sun being about 10° high and the sky partially covered with large haze-clouds, there was noticed in the south-west, against one of these clouds, a slightly curved band of prismatic colours about 90° in length; which, but for its position in the west, might have been mistaken for a rainbow—concave toward the sun, the sun, however, not at the centre of curvature, and about 30° distant from it. The green was most strongly marked; this shaded off on each side, and on the side of the band next the sun was red; upon the opposite side the colour was less distinct, but there it seemed to be reddish.

Again, during September or October 1882 (this from memory), at the same place, about sunset, with a patched, cloudy sky, the sun not visible, the prismatic colours were noticed in the south-west near a break in the clouds. This time the colours were in the form of an elongated ellipse, with indistinct edges, between 2° and 3° in greatest length.

Then, during the fall of 1883, the prismatic colours were once noticed under similar circumstances to those mentioned here in Virginia.

W. G. BROWN

University of Virginia, Virginia, U.S.A., January 12

### *The Iridescent Clouds alluded to above*

In our northern as well as insular position, with weakened sunshine and an atmosphere always more or less darkened by coal-smoke, we must be prepared to allow much for what is, and is to be, seen of the grander meteors of meteorology in the more southern latitude, clearer air, and intensified climate of the Virginian portion of so great a continent as America. But before any one there can claim to see frequently that very phenomenon of the iridescent clouds, communicated last December to NATURE by various persons, but by myself perhaps as the chief culprit, he must be quite sure, amid the crowd of known and already described parhelia, mock suns, broken rainbows, &c., that what he sees has the same discriminating optical characteristics as those particular clouds now in question; and that any one of his cases was, in America, so unusually brilliant a display of them, and so widespread an instance of it, that from one end of the States to the other it was on the same day similarly seen, wondered at, and declared even by gray-headed old men to be new to them, in at least anything approaching that astonishing degree of splendour and perfection, though by no means new to creation over a longer lapse of time.

The Virginian letter-writer, however, speaks merely of what he himself saw, describes the colours as prismatic, in place of the anti prismatic arrangement witnessed here, and alludes to one case of a curved band "about 90° in length," which contrasts exceedingly with the forms and sizes noted in this country.

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In fact I can hardly give a stronger confirmation of the rarity, and both the general character and universality of the phenomenon on that occasion, for all parts of Great Britain than by concluding with the following extract from a letter by Prof. A. S. Herschel of Newcastle-on-Tyne, dated December 25:—

"I saw," he writes "(and photographed from a window, but lost by over-exposing the plate, unfortunately), the iridescent clouds of Thursday's sunset you describe in NATURE, and nothing more beautiful than the diamond-beetle *elytra*, or Papilio-pario wing-scales, which glittered in the western sky could, as you wrote, be possibly *imagined!* They were seen also in the south of England (Kent) between 2 and 3 o'clock on the same afternoon.

"Mr. N. here says, in resumption of what they were probably, that he often sees such coloured fringes and colour-bows, in circles too, on clouds near and round the sun, by looking at the sun's reflection and that of the clouds just round him, in the plate-glass window of his drawing-room.

"So no doubt it was a good instance only of a common sight, but an instance yet, I should say, not to be seen much oftener than once or twice in a century!"

To that opinion I do not presume to add one word.

C. PIAZZI SMYTH

15, Royal Terrace, Edinburgh, January 28

### Manx Cats

WITH reference to Mr. Francis Galton's remarks in NATURE on Manx cats, I should like to ask whether any of your readers can assist me. Some little time ago I imported a few Manx cats with a view of trying experiments with them in crossing. But, as Mr. Galton says, it is difficult to get cats to breed in confinement, and of course it is of no use for the purpose of my experiment to allow the animals to roam at large among ordinary cats. Acting upon Mr. Galton's suggestion, therefore, I write to ask whether any of your readers happen to know of any island within a reasonable distance from town where a breed of Manx cats could be established. It is not necessary that the island should be a marine one. Any piece of ground insulated by fresh water would do equally well, provided it were of moderate size and not already tenanted by cats. If any of your readers should know of such a place I should be greatly obliged to them for a reference to its locality.

I may take this opportunity of further inquiring whether any of your readers would care to lend me, or tell me where to procure, a really good talking parrot for the purposes of systematic observation. GEORGE J. ROMANES

### Cross-breeding Potatoes

IT is well that your correspondent, Mr. James Melvin, has called attention to the dubious and erroneous ideas which now largely prevail on this subject. There is no reason to suppose that hybrids arising from *Solanum Maglia* will be disease-proof, for *S. Maglia*, like *S. tuberosum*, is one of the known hosts of the potato fungus, *Peronospora infestans*.

The errors appear to have arisen from the unfortunate conclusions,—"Economic Suggestions," given by Mr. J. G. Baker in his otherwise admirable paper laid before the Linnean Society, April 1884, p. 505.

Mr. Baker thinks that, because *S. Maglia* comes from humid positions in America, it will succeed in Britain better than *S. tuberosum*, a plant of the dry hills. The correctness of this idea I should very much question, the great strongholds of fungi being humid places. The fact of the habitat is an important one, but the deduction made from it is questionable.

Mr. Baker says the potato plant in its present tuber-bearing state is in a "disorganised and unhealthy condition." This view also is very much open to question: there is no evidence of disorganisation and unhealthiness in cultivated potatoes. Cultivated potato plants are no more disorganised and unhealthy than are any of our other cultivated kitchen garden plants, fruits, flowers, or domestic animals, including man himself. The notion that disorganised and unhealthy plants are "fitting subjects for the attacks of fungi and aphides" is a mistake, for fungi (*i.e.* parasitic fungi,—the fungi Mr. Baker has in view) do not grow upon "disorganised and unhealthy plants;" they require healthy plants on which to grow. Of course vegetable parasites require for their sustenance the vigorous elaborated juices of healthy plants, not the vitiated juices of "disorganised and unhealthy" ones.

Leaving theory for fact, I may point out that in the published results of experiments made by Dr. Hogg last autumn, both *S. Maglia* and *S. Jamesii* were badly diseased with parasitic fungi, and in Mr. Thomas Laxton's published experiments nearly the whole of the plants of *S. Maglia* and *S. Commersoni* (the two species specially recommended by Mr. Baker), as well as *S. Jamesii*, "disappeared from disease."

A year or two ago Mr. John King, British Vice-Consul, Carrizal, Bajo, Chili, sent to this country twenty stones of potatoes from positions in Chili where, during an experience of more than twenty years, the disease of potatoes had never been seen. It was perfectly unknown to the growers there.

These twenty stones of potatoes were planted in different parts of Great Britain and were a failure. They fell before *Peronospora infestans* quite as readily as did our own common potatoes.

No doubt good will arise from the experiments now being carried out, but not in the way generally assumed. The only theme for regret is the publication at the outset of (as I think) curiously mistaken deductions. These deductions, coming from such an excellent botanist as Mr. Baker, have led potato growers very much astray. WORTHINGTON G. SMITH

### Earthquake

THE annexed copy extracts from letter dated Kingston, Jamaica, January 8, from Capt. Spray, of our s.s. *Maroon*, will no doubt interest you. Are we right in thinking that the shock he felt was probably connected with the Spanish earthquakes?

J. G. S. ANDERSON

5, Fenchurch Avenue, London, E.C., January 27

*Extract of Letter from Capt. Spray*

*Kingston, January* 8

On the morning of December 22, 1884, in lat. 36° 48′, long. 19° 25′ W., we felt a shock as if the ship was grinding over a reef, although there was no difference in speed of engines; stopped and made every examination, but found no cause. My opinion it was a shock of earthquake, as some years before, nearly in the same place, I felt one more severe than the last.

### An Instance of "Protective Resemblance"

IN Mr. Johnston's interesting account of the ascent of Mount Kilimanjaro, in Equatorial Africa, which appears from time to time in the *Daily Telegraph*, occurs a passage which seems deserving of being rescued from the comparative oblivion of the pages of a daily newspaper. It will be found in the number of the 16th inst., and is as follows:—"Other noticeable features in the scene were the tall red ant-hills and, strange imitation, the tall red antelopes, a species of hartebeest, resembling faintly in shape the form of a giraffe with sloping hind-quarters, high shoulders, and long neck. Being a deep red-brown in colour, and standing one by one stock-still at the approach of the caravan, they deceived even the sharp eyes of my men, and again and again a hartebeest would start up at twenty yards distance and gallop off, while I was patiently stalking an ant-hill, and crawling on my stomach through thorns and aloes, only to find the supposed antelope an irregular mass of red clay."

New University Club, January 20 J. C. G.

### Hibernation

WILL you allow me to invite attention of anthropologists and zoologists to the very remarkable (and to me surprising) statement contained in the article "Hibernation" (W. F. Kirby), last edition of the "Encyclopædia Britannica." Reference is there made to a work by Mr. Baird, entitled "Human Hybernation" (1850), giving examples on "unimpeachable authority" of the powers of religious ascetics in India of throwing themselves into a state closely resembling hibernation for an indefinite period; and quoting a case of a Fakir who was actually buried alive at Lahore in 1837 in presence of Runjeet Sing and Sir Charles Wade, and was dug up and restored to consciousness several months afterwards! Now, it is ascertained that hares can exist for weeks together buried in the snow, and if this power of hibernation can be developed at will, might it not also be so on necessity, and explain the former existence of the Siberian mammoths, through the winter months: these animals might, as winter approached, have withdrawn to sheltered hollows, where

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